JAYPEE UNIVERSITY OF INFORMATION TECHNOLOGY, WAKNAGHAT

TEST -1 EXAMINATION- 2026

MSc-II Semester (BT)

Course Code (Credits): 20MSWBT231 (2) Max. Marks: 15

Course Name: Nanobiotechnology

Course Instructor: Dr. Abhishek Chaudhary Max. Time: 1 Hour

Note: *(a) All questions are compulsory.*

(b) The candidate is allowed to make Suitable numeric assumptions wherever required for solving problems

(c) Use of calculators is not allowed

Q.No	Question	Marks
Q1	MRI contrast agents are contrast agents used to improve the visibility of internal body structures in magnetic resonance imaging (MRI). The most commonly used compounds for contrast enhancement are gadolinium-based contrast agents. They are injected intravenously to improve the visualization of tissues, tumours, and blood vessels. If 8 mL of a contrast agent is used and the thickness of the contrast agent layer is assumed to be 1 nm, calculate the area covered by the contrast agent.	5
Q2	A benign tumor is a mass of cells that does not invade surrounding tissues or metastasize. Assuming the benign tumor to be spherical in shape, and considering a fixed total volume, 1. Calculate how the surface area changes when the radius is (a) halved (b) doubled 2. Comment on the biological significance of this change in surface area with respect to nutrient diffusion.	5
Q3	a. Differentiate between intentional and non-intentional nanomaterials. Explain their sources, examples, applications, and potential environmental and health impacts. b. Also explain the significance of the Lycurgus Cup as an example of ancient nanotechnology. Discuss the role of metal nanoparticles in producing its unique optical properties.	5

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